American Cyanamid
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EVALUATION AND SITE INSPECTION OF AMERICAN CYANAMID HANNIBAL, MISSOURI

Prepared for:

U.S. Environmental Protection Agency
Region VII
Kansas City, Missouri

EPA Contract Number 68-01-6515

Work Assignment R07-005

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1.0 INTRODUCTION

An inspection of the American Cyanamid (Cyanamid) facility (MOD-050226075) located in Hannibal, Missouri, was undertaken on 16 September 1982 to evaluate compliance with the Resource Conservation and Recovery Act (RCRA) ground-water monitoring regulations promulgated in 40 CFR, Section 265. RCRA regulations require that the owner or operator of a surface impoundment, landfill or land treatment facility used for management of hazardous waste implement a ground-water monitoring program.

The applicability of the aforementioned regulations to the Hannibal facility is suspect. The designated hazardous-waste management facility, which includes three surface impoundments, may not contain hazardous waste. Cyanamid has sought to demonstrate the non-hazardous nature of the waste which is treated and/or stored in the impoundments.

2.0 HAZARDOUS-WASTE MANAGEMENT

The Hannibal plant manufactures agricultural chemicals including pesticides, fertilizer, pharmaceuticals, nitric acid and animal feed supplement. The manufacturing processes include the use and production of materials which are deemed hazardous. These processes also produce hazardous wastes which are treated and/or stored on-site.

Hazardous wastes are stored in surface impoundments (3) or tanks. Some hazardous wastes are subjected to neutralization or incineration. Neutralization sumps, included in the Part A - Hazardous-Waste Permit Application submitted to the U.S. Environmental Protection Agency (EPA), have been re-defined as tanks. All hazardous wastes which can conceivably be generated on-site are listed in the Part A application.

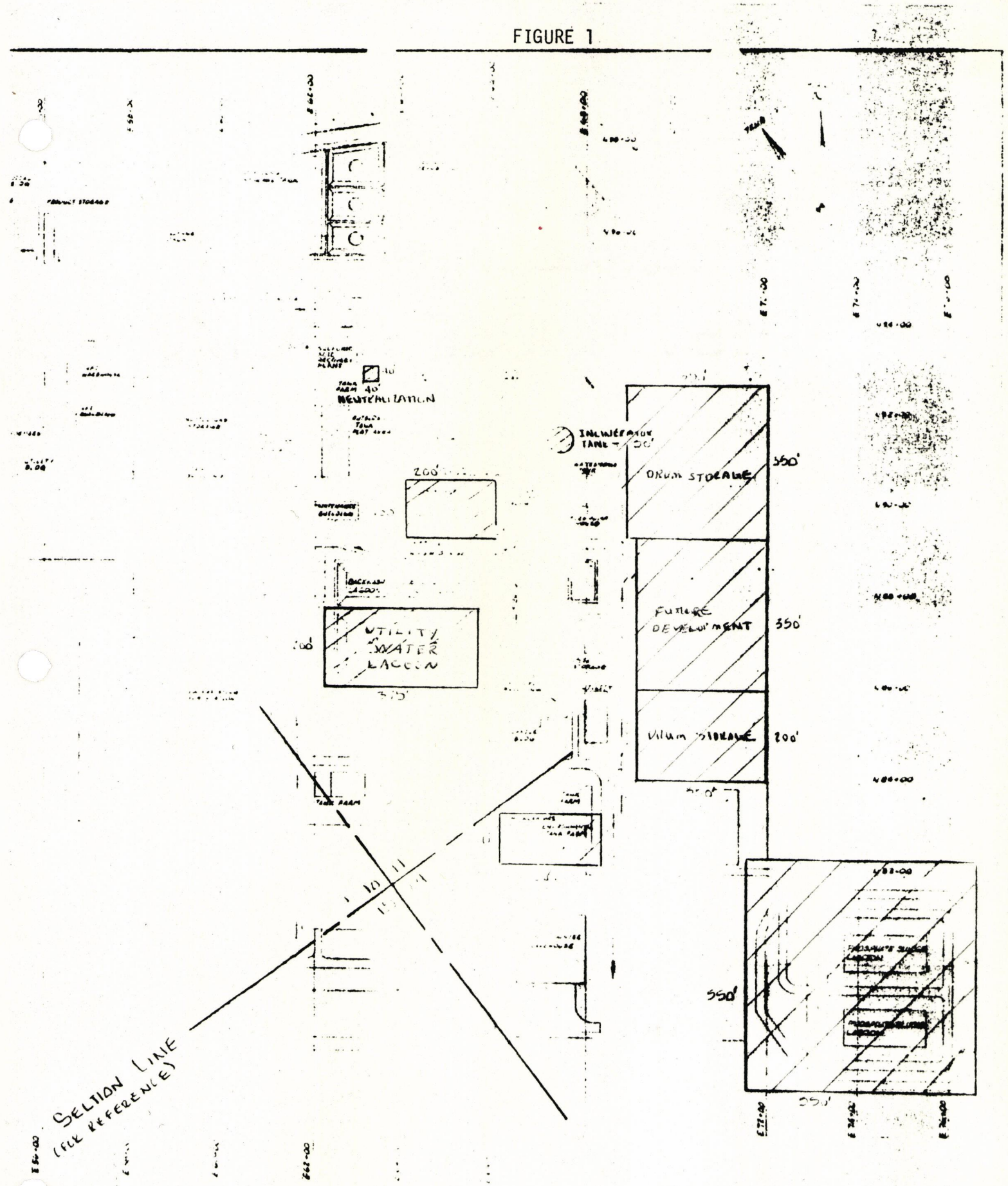
2.1 PHORATE - STORAGE AND TREATMENT

Included in the permit application is phorate, an organophosphate pesticide. Waste phorate and tank-washdowns are stored in an aqueous waste tank until incineration. Waste solvents, such as alcohol and TCE, may be included in the waste to be incinerated. The incinerators (a primary and two back-up units) operate at 980°C, a temperature acknowledged by Cyanamid personnel as being capable of destroying 99.994% of the aqueous and gaseous waste.

The residual sludge, a maximum output of 0.21 lbs/day, is pumped to the two phosphate sludge lagoons or surface impoundments (Figure 1). Overflow from the sludge lagoons is pumped to the utility water lagoon, used primarily to hold plant water prior to discharge to the Mississippi River, as provided through Cyanamid's NPDES permit. The effluent, which averages 1.25 million gallons/day, is monitored daily at the point of discharge.

The lagoons are built above the normal grade; the bottoms are completed to or just above the normal grade. The lagoons are constructed

FIGURE 1



DENOTES HAZARDOUS WASTE MANAGEMENT FACILITIES

of native clay materials, characteristic of the extensive glacial deposits of the region. The clays display permeabilities of 10^{-7} gm/sec, occasionally ranging as low as 10^{-11} cm/sec. The utility lagoon is secured with limestone riprap to prevent erosion of the lagoon sides.

Sludge neutralization is accomplished through the addition of lime to the sludge lagoons. Within a few weeks of the site inspection, the sludge lagoons will be abandoned, along with a change in the neutralization process which will utilize soda ash.

2.1.1 Waste Characterization

The EPA presently considers the phosphate sludge a hazardous material. Biologically-treated organophosphate pesticide wastes are typically hazardous, but this classification may not apply to the sludge produced by incineration. Cyanamid is the sole producer of phorate in the United States; Company personnel are confused as to what data the EPA has used to determine the hazardous character of the phosphate sludge. The EPA may have assumed that all organophosphate sludges are hazardous.

Cyanamid has attempted to prove the non-hazardous nature of the phosphate sludge. Samples were taken from the phosphate sludge lagoon and the utility lagoon. Sample analysis, as presented in Attachment 1, has demonstrated that the sludge is non-hazardous. Cyanamid, through the use of a Company-developed, EPA-approved method of pesticide analysis, has determined the pesticide concentration of the sludge from the phosphate lagoon to be less than 10 parts per billion (ppb). The sludge is devoid of appreciable concentrations of heavy metals; the cooling towers do not utilize heavy metals.

According to Cyanamid personnel, the EPA has collected and analyzed the sludge on two occasions, both times having found no priority pollutants.

The phosphate sludge is composed of 50% phosphate. Once the sludge is deemed non-hazardous, Cyanamid plans to remove the sludge from the lagoons and use it to fertilize on-site land and adjacent fields.

3.0 APPLICABILITY OF THE RCRA GROUND-WATER MONITORING REGULATIONS

RCRA regulations promulgated in 40 CFR, Section 265, Subpart F, require that the owner or operator of a surface impoundment, landfill or land treatment facility used to manage hazardous waste implement a ground-water monitoring program. Based on the available data, the three surface impoundments designated as part of the hazardous-waste management area do not contain hazardous waste; therefore, the facility is not required to comply with the aforementioned ground-water monitoring regulations.

Following is a summary of the approximate composition of the major constituents of the sludge

	Phosphate Sludge Lagoon	Utility Lagoon
Solids Concentration	20%	6%
Calcium	25-30% (dry basis)	15% (dry basis)
Phosphate	50% (dry basis)	16% (dry basis)
Sodium	5%	8% (dry basis)
Magnesium	0.1%	1% (dry basis)
Iron	0.4%	2% (dry basis)
Sulfate	30 Mg/l	75 Mg/l
Pesticides	<10 ppb	<30 ppb

E P Toxicity Results

Arsenic	<2,400 Mg/l	<2,400 Mg/l
Barium	<5,000 "	<5,000 "
Cadmium	<15 "	<15 "
Chromium	<50 "	<50 "
Lead	3 "	<2 "
Mercury	0.5 "	<0.2 "
Selenium	<5 "	<5 "
Silver	<1 "	<1 "
Endrin	<0.24 "	<0.28 "
Lindane	<0.64 "	<0.7 "
Methoxychlor	<1.2 "	<1.3 "
Toxaphene	1.4 "	<1.0 "
2, 4-D	<0.48 "	<0.52 "
Silvex	<1.7 "	<1.9 "

We need to remove the sludge from these lagoons to allow the lagoons to operate as they were designed to ensure compliance with the Plant's NPDES Permit requirements.

ATTACHMENT 1

APPENDIX - A

COMPLIANCE CHECKLIST FORMS

APPENDIX A-1

FACILITY INSPECTION FORM FOR COMPLIANCE WITH INTERIM STATUS STANDARDS COVERING GROUND-WATER MONITORING

Company Name: American Cyanamid Co. ; EPA I.D. Number: MOD050226075

Company Address: P.O. Box 517 ; Inspector's Name: J. Tosiucci, Jr.

Hannibal, Missouri 63401

Company Contact/Official: J. Brad Willett ; Branch/Organization: Agricultural Division

Title: Environmental Services Supervisor ; Date of Inspection: 16 September 1982

Type of facility: (check appropriately)	Yes	No	Unknown	Waived
a) surface impoundment	✓(3)			
b) landfill				
c) land treatment facility				
d) disposal waste pile*				
Ground-Water Monitoring Program				
1. Was the ground-water monitoring program reviewed prior to site visit? If "No",		✓**		
a) Was the ground-water program reviewed at the facility prior to site inspection?		✓**		
2. Has a ground-water monitoring program (capable of determining the facility's impact on the quality of groundwater in the uppermost aquifer underlying the facility) been implemented? 265.90(a)		✓**		

*Listed separate from landfill for convenience of identification.

** A ground-water monitoring system has not been established at the facility because the waste contained in the surface impoundments has been demonstrated to be of a non-hazardous nature.

	Yes	No	Unknown	Waived
3. Has at least one monitoring well been installed in the uppermost aquifer hydraulically upgradient from the limit of the waste management area? 265.91(a)(1)	N/A	____		____
a) Are ground-water samples from the uppermost aquifer, representative of background ground-water quality and not affected by the facility (as ensured by proper well number, locations and depths?)	N/A	____		
4. Have at least three monitoring wells been installed hydraulically downgradient at the limit of the waste handling or management area? 265.91(a)(2)	N/A	____		
a) Do well number, locations and depths ensure prompt detection of any statistically significant amounts of HW or HW constituents that migrate from the waste management area to the uppermost aquifer?	N/A	____		____
5. Have the locations of the waste management areas been verified to conform with information in the ground-water program?	N/A	____	____	
a) If the facility contains multiple waste management components, is each component adequately monitored?	N/A	____		
6. Do the numbers, locations, and depths of the ground-water monitoring wells agree with the data in the ground-water monitoring system program? If "No", explain discrepancies.	N/A	____	____	
7. Well completion details. 265.91(c)				
a) Are wells properly cased?	N/A	____	____	
b) Are wells screened (perforated) and packed where necessary to enable sampling at appropriate depths?	N/A	____	____	
c) Are annular spaces properly sealed to prevent contamination of ground-water?	N/A	____	____	

	Yes	No	Unknown
8. Has a ground-water sampling and analysis plan been developed? 265.92(a)	N/A	____	____
a) Has it been followed?	N/A	____	____
b) Is the plan kept at the facility?	N/A	____	____
c) Does the plan include procedures and techniques for:			
1) Sample collection?	N/A	____	
2) Sample preservation?	N/A	____	
3) Sample shipment?	N/A	____	
4) Analytical procedures?	N/A	____	
5) Chain of custody control?	N/A	____	
9. Are the required parameters in ground-water samples being tested quarterly for the first year? 265.92(b) and 265.92 (c)(1)	N/A	____	
a) Are the ground-water samples analyzed for the following:			
1) Parameters characterizing the suitability of the ground-water as a drinking water supply? 265.92(b)(1)	N/A	____	
2) Parameters establishing ground-water quality? 265.92(b)(2)	N/A	____	
3) Parameters used as indicators of ground-water contamination? 265.92(b)(3)	N/A	____	
(i) For each indicator parameter are at least four replicate measurements obtained at each upgradient well for each sample obtained during the first year of monitoring? 265.92(c)(2)	N/A	____	
(ii) Are provisions made to calculate the initial background arithmetic mean and variance of the respective parameter concentrations or values obtained from the upgradient well(s) during the first year? 265.92(c)(2)	N/A	____	
b) For facilities which have completed first year ground-water sampling and analysis requirements:			
1) Have samples been obtained and analyzed for the ground-water quality parameters at least annually? 265.92(d)(1)	N/A	____	
2) Have samples been obtained and analyzed for the indicators of ground-water contamination at least semi-annually? 265.92(d)(2)	N/A	____	

	Yes	No	Unknown
c) Were ground-water surface elevations determined at each monitoring well each time a sample was taken? 265.92(e)	N/A	____	
d) Were the ground-water surface elevations evaluated annually to determine whether the monitoring wells are properly placed? 265.93(f)	N/A	____	
e) If it was determined that modification of the number, location or depth of monitoring wells was necessary, was the system brought into compliance with 265.91(a)? 265.93(f)	N/A	____	
10. Has an outline of a ground-water quality assessment program been prepared? 265.93(a)*	N/A	____	
a) Does it describe a program capable of determining:			
1) Whether hazardous waste or hazardous waste constituents have entered the ground water?	N/A	____	
2) The rate and extent of migration of hazardous waste or hazardous waste constituents in ground water?	N/A	____	
3) Concentrations of hazardous waste or hazardous waste constituents in ground water?	N/A	____	
b) After the first year of monitoring, have at least four replicate measurements of each indicator parameter been obtained for samples taken for each well? 265.93(b)	N/A	____	
1) Were the results compared with the initial background means from the upgradient well(s) determined during the first year?	N/A	____	
(i) Was each well considered individually?	N/A	____	
(ii) Was the Student's t-test used (at the 0.01 level of significance)?	N/A	____	
2) Was a significant increase (or pH decrease as well) found in the:			
(i) Upgradient wells	N/A	____	
(ii) Downgradient wells	N/A	____	
If "Yes", Compliance Checklist A-2 must also be completed.			

*See note Page 2-10

	Yes	No	Unknown
11. Have records been kept of analyses for parameters in 265.92(c) and (d)? 265.94(a)(1)	N/A	____	
12. Have records been kept of ground-water surface elevations taken at the time of sampling for each well? 265.94(a)(1)	N/A	____	
13. Have records been kept of required elevations in 265.93(b)? 265.94(a)(1)	N/A	____	
14. Have the following been submitted to the Regional Administrator 265.94(a)(2) :*			
a) Initial background concentrations of parameters listed in 265.92(b) within 15 days after completing each quarterly analysis required during the first year?	N/A	____	
b) For each well, have any parameters whose concentrations or values have exceeded the maximum contaminant levels allowed in drinking water supplies been separately identified?	N/A	____	
c) Annual reports including:			
1) Concentrations or values of parameters used as indicators of ground-water contamination for each well along with required evaluations under 265.93(b)?	N/A	____	
2) Any significant differences from initial background values in up-gradient wells separately identified?	N/A	____	
3) Results of the evaluation of ground-water surface elevations?	N/A	____	

*EPA will be proposing (Spring 1982) to replace this reporting requirement with an exception reporting system where reports will be submitted only where maximum contaminant levels or significant changes in the contamination indicators or other parameters are observed. EPA has delayed compliance stage for 14 a) above until August 1, 1982 (Federal Register, February 23, 1982, p.7841-7842) to be coupled with exception reporting in the interim.